
Language Supplement



Speechify 3.0 for de-DE
(German)

Document History

Date	Release Name
August 2003	Second Edition — for Speechify 3.0
February 2003	First Edition, update 5 — for Speechify 2.1.6
January 2003	First Edition, update 4 — for Speechify 2.1.5
July 2002	First Edition, update 3 — for Speechify 2.1
April 2002	First Edition, update 2 — for Speechify 2.1
March 2002	First Edition, update — for Speechify 2.0
March 2002	First Edition — for Speechify 2.0

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U.S. Patent Nos. 5,995,928; 5,809,494; 5,765,130; 6,061,651; and 6,173,266. One or more patents may be pending in the United States and other countries.

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Published by:

SpeechWorks International, Inc.
695 Atlantic Avenue
Boston, MA 02111

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Introduction

Overview

This document contains language-specific reference information for application developers using SpeechWorks Speechify 3.0 and higher.

Speechify™ is a Text-To-Speech (TTS) system.

New and changed information

Information about installing voices has been moved from this supplement to the *Speechify User's Guide*.

There are small improvements throughout this document.

See the *Speechify Migration Guide* for a complete list of changes in Speechify 3.0.

Getting started

To get started, we recommend that you are familiar with the *Speechify User's Guide*, which provides comprehensive installation, programming, and reference information about the Speechify product. You should also review the release notes distributed with this product for the latest information, restrictions, and known problems.

Other documents in the Speechify documentation set:

- *Speechify E-Mail Pre-processor Developer's Guide* explains the types of input that the SpeechWorks E-mail Pre-processor handles, how it processes the messages, the modes that the application can take advantage of at runtime, the layout and use of the E-mail substitution dictionary, and provides the API function prototypes, types, error codes and constants.

Information about installing voices has been moved from this supplement to the *Speechify User's Guide*.

The “Rick” voice is being de-supported in favor of the new “Tom” voice.

There are small improvements throughout this document.

See the *Speechify Migration Guide* for a complete list of changes in Speechify 3.0.

Support services

To receive technical support from SpeechWorks International, Inc., use the following methods:

- Check the FAQs, visit the Knowledge Base, or ask a question at:

<http://techsupport.speechworks.com/>

- Ask for “technical support” at +1 617 428-4444



Standard Text Normalization

Speechify's text normalization is the component that interprets the input text and converts it into a sequence of fully spelled-out words. It encompasses digit conversion, abbreviation and acronym expansion, punctuation handling, and the interpretation of special characters such as currency symbols. It is this component of the system that is primarily responsible for an intelligent reading of text.

This chapter is a guide to the major features of Speechify's default text normalization, which applies unless overridden by a Main or Abbreviation Dictionary entry or an embedded tag. The *Speechify User's Guide* describes default normalization for all languages; below, the discussion describes behaviors specific to de-DE.

The processing is described in general terms as an aid to application developers in constructing Main and Abbreviation Dictionaries, custom pre-processors, and marked-up text. It is beyond the scope of this chapter to provide an exhaustive description of the entire set of sophisticated, context-sensitive text normalization rules used in Speechify, and you may therefore observe deviations from the generalizations provided here in specific instances.

Definitions of symbols

Symbols used in the tables in this chapter are:

Symbol	Meaning
d or d (in recognized format column)	digit
a (in recognized format column)	lowercase letter
A (in recognized format column)	uppercase letter
n (in recognized format column)	a number
mm/dd/yy	month/day/year

Symbol	Meaning
hh:mm:ss	hour:minute:second
, (in text expansion examples)	pause and/or comma-like phrase break

Numbers

Cardinal numbers

Cardinal numbers can use either a period or a space as a unit separator.

Example	Expansion
1.213.572	eine million zweihundert dreizehn tausend fünfhundert zweiundsiebzig
50 000	fünfzig tausend

Ordinal numbers

Case endings are added to ordinal numbers that modify nouns.

Example	Expansion
das 1. Buch	das erste buch
aus dem 1. Band	aus dem ersten band
für ein 2. Jahr	für ein zweites jahr
aus 2. Hand	aus zweiter hand

Floating point digits

Recognized format	Example	Expansion
<i>n.n</i>	16.01	sechzehn komma null eins

Negative numbers

Recognized format	Example	Expansion
<i>-n</i>	-37	minus siebenunddreißig

Four digit numbers

Four-digit numbers with no thousands separator are pronounced as years by default.

Example	Expansion
1200	zwölf hundert
1984	neunzehn hundert vierundachtzig
2000	zweitausend
2112	zweitausend einhundert zwölf

Fractions

Fraction characters and fractions with single digits in both the numerator and denominator are expanded as follows:

Example	Expansion
$\frac{1}{4}$ or 1/4	einviertel
3 $\frac{1}{4}$	drei einviertel
$\frac{1}{3}$	eindrittel
$\frac{1}{2}$ or 1/2	einhalb
8 $\frac{1}{2}$	achteinhalb
$\frac{3}{4}$ or 3/4	dreiviertel
7 $\frac{3}{4}$	sieben dreiviertel
$\frac{3}{8}$	dreiachtel

Case is added to einhalb in certain contexts:

Example	Expansion
$\frac{1}{2}$ Pfund Butter	einhalbes pfund butter

Fractions with more than one digit in the numerator or denominator are ambiguous, and so are expanded literally:

Example	Expansion
2 1/2	zwei eins schrägstrich zwei

Zero-initial numbers

Numbers beginning with 0 are spoken digit by digit.

Example	Expansion
02319	null zwei drei eins neun

Numeric expressions

Dates

Recognized date formats are shown in the table below. Two-digit years are spoken neutrally as to century.

Format	Example	Expansion
(d)d.(m)m.	10.07.	zehnter juli
(d)d.(m)m.(yy)yy	25.10.1988	fünfundzwanzigster oktober neunzehnhundert achtundachtzig
	1.1.2000	erster januar zweitausend

The case ending on the day is modified according to context. For example:

Input	Expansion
23.2.1986	dreiundzwanzigster februar neunzehnhundert sechsendachtzig
am 5.5.91	am fünften mai einundneunzig
der 02.08.	der zweite august

Times

Times are recognized with either a period or a colon delimiter, but only if the time is followed by Uhr, UHR, MEZ, or h since otherwise the expression is ambiguous. An exception is a colon-delimited time in which the hour begins with a leading zero, since this cannot be interpreted in any other way.

Recognized format	Example	Expansion
(h)h.mm Uhr	12.25 Uhr	zwölf uhr
(h)h.mm UHR		fünfundzwanzig
(h)h.mm Uhr	1:30 Uhr	ein uhr dreißig
(h)h.mm UHR		

Recognized format	Example	Expansion
(h)h:mmh	12.25h	zwölf uhr fünfundzwanzig
(h)h.mm MEZ (h)h:mm MEZ	3.30 MEZ 3:30 MEZ	drei uhr dreißig em eh zett
0h:mm	04:12	vier uhr zwölf

Currency

Currency expressions of the denominations listed below are handled.

Subunits

Any of the supported currency types (defined in the next sections) may contain subunits. Note that a dash symbol (-) may be used to explicitly indicate zero subunits. Examples:

Example	Expansion
5,10 €	fünf euro zehn
0,10 €	zehn cent
7,00 €	sieben euro
7,-- €	
EUR 7,50	sieben euro fünfzig
66,-- EUR	sechshundsechzig euro
56,78 DM	sechshundfünfzig mark achtundsiebzig
0,78 DM	achtundsiebzig pfennig
100,-- DM	einhundert mark
\$5,10	fünf dollar zehn
\$0,50	fünfzig pfennig
\$10,00	zehn dollar
\$10,--	
£2,34	zwei pfund sterling vierunddreißig

Euros

Recognized format	Example	Expansion
$n\text{€}$	100 €	einhundert euro
$n\text{€}$	100€	
$n\text{EUR}$	100 EUR	
EUR n	EUR 100	

Marks

Recognized format	Example	Expansion
DM n	DM 100	einhundert mark
$n\text{DM}$	100 DM	

Dollars

Recognized format	Example	Expansion
$\$n$	$\$100$	einhundert dollar

Pounds sterling

Recognized format	Example	Expansion
$£n$	$£100$	einhundert pfund sterling

Negative currency

Negative currency values can be denoted with a minus sign immediately preceding the number. For example:

Example	Expansion
-300 €	negativ dreihundert euro
$\$-10,00$	negativ zehn dollar

Mixed alphanumeric tokens

Mixed alphanumeric sequences are either spelled out, divided into words, or, in special cases, read as whole words. For example:

Example	Expansion
3mal	dreimal
18jährige	achtzehnjährige
10%ige	zehnprozentige
99er	neunundneunziger
68ern	achtundsechzigern
VOS34	fau oh ess vierunddreißig
32XC	zweiunddreißig iks ce
J2EE	jott zwei eh eh
Box2	box zwei
60plus	sechzig plus
5cm	fünf zentimeter

Abbreviations

Most abbreviations consist of a sequence of letters optionally ending in a period. In German, abbreviations have a few other possible formats, as shown in the following table:

Format	Example	Expansion
hyphenated abbreviations	Dr.-Ing.	doktoringenieur
abbreviations in compound words	Hauptstr.	hauptstraße
multi-token abbreviations	m. o. w. m.o.w.	mehr oder weniger

Ambiguity in abbreviations

Some abbreviations are ambiguous, in that they can be either an abbreviation or a whole word. For example, Jan is either the abbreviation for Januar, or the name Jan. Speechify employs a set of context-sensitive rules to disambiguate the first type of ambiguous abbreviation. A token of this type is interpreted as an abbreviation only in specific disambiguating contexts. For example, when the abbreviation ends in a period, and the following word begins with a lower case letter, it is interpreted as an abbreviation. For example:

Input	Expansion
Gestern haben wir Jan aus Köln geholt.	gestern haben wir jan aus köln geholt.
Er kam im Jan. zurück.	er kam im januar zweitausend zurück.

Periods in abbreviations

Note that abbreviations do not necessarily end in a period:

Input	Expansion
Verzeichnis deutschsprachiger Zeitungen bzw Zeitschriften	verzeichnis deutschsprachiger zeitungen beziehungsweise zeitschriften

Once the abbreviation is expanded, if it ended in a final period it must be determined whether or not the period also indicates a sentence end:

Input	Expansion
Auf den Wiesen liegt 1 m. Schnee.	auf den wiesen liegt ein meter schnee.
Der Schneefall beträgt im Durchschnitt 1 m. Letztes Jahr hatten wir aber keinen Schnee.	der schneefall beträgt im durchschnitt einen meter. letztes jahr hatten wir aber keinen schnee.

Uppercase acronyms and tokens

Uppercase acronyms and other tokens written in uppercase are either read out letter by letter, read as a whole word, or given an idiosyncratic interpretation. Examples:

Example	Pronunciation
TTS	tee tee ess
SPD	ess pe de
CMOS	ce moss
UNICEF	unicef

E-mail addresses

An e-mail address is divided into two portions, a user name and a domain name, separated by an @. A phrase break is inserted following the user name. Symbols in the e-mail address are read as follows:

Symbol	Expansion
@	at
.	punkt
-	bindestrich
—	unterstreichung

User name

The user name is spelled out character by character, unless word boundaries are indicated unambiguously. Sequences of two and three letters are always spelled out. Digit sequences are read digit by digit. Examples:

User name	Expansion
max_goldt	max unterstreichung goldt
jan.koch	jan punkt koch
stern-fischer	stern bindestrich fischer

User name	Expansion
philipp5050	philipp fünf null fünf null
rot	err oh te
rfrmac	err eff err emm ah ce

Domain name

Two letter country and domain extensions are spelled out, while three-letter domain extensions are generally read as words. The host name is read as a single word, unless word boundaries are indicated unambiguously. Examples:

Host name	Expansion
amazon.co.de	amazon punkt cee oh punkt de eh
access1.net	access eins punkt net
hawaii.rr.com	hawaii punkt ar ar dot com
cornell.edu	cornell punkt eh de uh
amazon.de	amazon punkt de eh

URLs

A token beginning with `www.` or `http://` or `ftp://` is interpreted as a URL. A phrase break is inserted following `http://` or `ftp://`, and the `://` are not pronounced.

Symbols in a URL are expanded as follows:

Symbol	Expansion
/	URL-final: not expanded (otherwise: schrägstrich)
.	punkt
-	bindestrich
_	unterstreichung

Each slash-delimited segment of the URL is expanded as follows: Two- and three-letter domain and country extensions are either read as words or spelled out, following standard conventions. Each remaining segment is read as a single word, unless word boundaries are indicated unambiguously. Examples:

URL	Expansion
http://www.lobin.freeseve.co.uk/sarabs-price/page001.html	ha te te pe, we we we punkt lobin punkt freeseve punkt ce oh punkt uh ka schrägstrich sarabs bindestrich price schrägstrich page null null eins punkt ha te emm ell
www.serbia-info.com/news/	we we we punkt serbia bindestrich info punkt com schrägstrich news

File names and paths

Symbols in paths are expanded as follows:

Symbol	Expansion
/	URL-final: not expanded (otherwise: schrägstrich)
\	URL-final: not expanded (otherwise: inverser schrägstrich)
:	doppelpunkt
.	punkt
-	bindestrich
_	unterstreichung

Each slash-delimited segment of a path is read as a single word, unless word boundaries are unambiguously indicated. Common file name extensions are read as a word or spelled out, following standard conventions. Examples:

Path	Expansion
C:\docs\mein_buch\kapitel12.doc	ce doppelpunkt inverser schrägstrich docs inverser schrägstrich mein unterstreichung buch inverser schrägstrich kapitel zwölf punkt doc
/produkt/freigabe/speechify-2-1-5/anmerkungen.txt	schrägstrich produkt schrägstrich freigabe schrägstrich speechify bindestrich zwei bindestrich eins bindestrich fünf schrägstrich anmerkungen punkt te ikss te.

Punctuation

Punctuation generally triggers a phrase break, except in a limited set of special cases that are determined on a language-specific basis. Examples of these are:

Input	Expansion
Das ist ein sehr, sehr altes Haus.	das ist ein sehr sehr altes Haus
Die Fahrt dauerte 4 Stunden, 8 Minuten.	die fahrt dauerte vier stunden acht minuten
Laufwerk D: ist voll.	laufwerk de ist voll.

Parentheses

Parentheses generally trigger a phrase break:

Input	Expansion
Peter (mein Sohn) and Gisela (meine Tochter)	peter, mein sohn, und gisela, meine tochter

The phrase break does not happen in a very limited set of special cases.

Input	Expansion
Gewinner(en)	gewinneren
getText()	get text

Hyphen

The hyphen is read neutrally as “Bindestrich” unless it can be disambiguated with a high degree of confidence. Examples:

Input	Expansion
Schleswig-Holstein	schleswig holstein
32-bit	zweiunddreißig bit
-7	minus sieben
3-4 April	drei bis vier april
S. 35-40	seite fünfunddreißig bis vierzig
1974-1975	neunzehnhundert vierundsiebzig bis neunzehnhundert fünfundsiebzig
2-3 Grad	zwei bis drei grad
3-2	drei bindestrich zwei (since could be drei bis zwei, drei minus zwei, drei zwei, etc.)

Slash

A slash is read as “schrägstrich” unless the following word is a unit of measure, when the slash is read as “pro,” or when the entire token is a familiar expression.

Input	Expansion
Berlin/Hamburg	berlin schrägstrich hamburg
km/h	kilometer pro stunde
Frankfurt/Main	frankfurt am main



Embedded Tags

Embedded tags are special codes that can be inserted into input text to customize Speechify's behavior in a variety of ways. The *Speechify User's Guide* describes the Speechify tag format and functionality. Below is the description of a tag that is specific to German.

Pronouncing numbers and years

In German, a four digit numeric sequence with no internal periods (.) or trailing decimal digits, like *1984*, can be interpreted either as a year (*neunzehnhundert vierundachtzig*) or as a quantity (*eintausend neunhundert vierundachtzig*). Speechify applies the year interpretation by default, as in:

Input	Pronunciation
Er ist im Mai 1945 geboren.	Er ist im Mai neunzehnhundert fünfundvierzig geboren.

To override or restore the default year interpretation, use the following tags:

Year mode tag	Description
\iny0	Quantity interpretation.
\iny1	Year interpretation (default).

For example:

Input	Pronunciation
Im Mai sind 1945 Personen nach Neuseeland ausgewandert.	Im Mai sind eintausend neunhundert fünfundvierzig Personen nach Neuseeland ausgewandert.

Each tag remains in effect until the interpretation is toggled by the use of the other tag. For example:

Input	Pronunciation
\ny0 1945 \ny1 Personen sind im Jahre 1945 ausgewandert.	Eintausend neunhundert fünfundvierzig Personen sind im Jahre neunzehnhundert fünfundvierzig ausgewandert.

Pronouncing postal addresses

Use “address mode” to improve the interpretation of postal addresses for Germany, Austria and German-speaking Switzerland. The address tags enclose a single address or a list of addresses:

Tag	Description
\addr1	Begin address mode.
\addr0	End address mode.

Address mode remains in effect until turned off with the end tag (or until the end of the speak request).

Address formats

Addresses have the following parts. *Separate each part using commas or newlines.*

- ❑ Street address - a street number and name with typical abbreviations.
- ❑ Post office box number - can appear before, after, or in place of a street address.

- ❑ City-State - can include a postal code, town name and regional information (municipality information, federal state in Germany or Austria, or canton in Switzerland).

Use address delimiters to improve the speech

To improve the resulting speech, insert newline or comma delimiters between address parts. Otherwise, any ambiguities will degrade the spoken output.

If the street address contains an apartment, suite, floor, or building number, you can improve the speech by separating the element with a newline or a comma. The following examples will be pronounced in the same way:

Gebäude 1, Bischofsweg 14, 01324 Dresden

Gebäude 1
Bischofsweg 14
01324 Dresden

In a list of addresses (where address mode is turned ON for more than one address), each address should end with a double newline. Alternatively, you can enclose each address separately within address tags. That is, the following are equivalent:

\!addr1
Bischofsweg 14, 01324 Dresden

Dorfstr. 5a, 3400 Burgdorf BE

A-1010 Wien, Opernring 15
\!addr0

\!addr1 Bischofsweg 14, 01324 Dresden\!addr0
\!addr1 Dorfstr. 5a, 3400 Burgdorf BE \!addr0
\!addr1 A-1010 Wien, Opernring 15 \!addr0

Examples of addresses

Comma-delimited:

Am Marktplatz 22, 14770 Brandenburg a d Havel

9010 Klagenfurt, Domgasse 12, Postfach 660

Postf. 300, Tannholzstr. 23, 5001 Aarau

Newline-delimited:

Leipziger Str. 3
D-01640 Coswig b Dresden

5071 Salzburg
Getreidegasse 9
Postf. 5001

Sandhubel 42
Postfach 3055
CH-4056 Basel

Avoid extraneous text

Once address mode begins, all text is assumed to be part of the address, so you should avoid including non-address text inside the tags. A contrived example:

```
\!addr1 3052 Belp Helitransport AG 675 Angestellten \!addr0
```

The string above is read “Drei null fünf zwei Belp Helitransport Aargau sechs sieben fünf Angestellten” since all of it is included in one line with a postal code.

However, addresses may include a limited amount of additional text such as company or building names. For example:

Arzthaus
Klinikstr. 4
D-22767 Hamburg

How numbers are processed

The following rules apply to cardinal numbers in addresses, such as house numbers, apartment numbers, and postal codes.

- ❑ 1-2 digits – Read as ordinary numbers.
- ❑ 3 digits – If the digits end in zeros (x00), the number is read “x hundert,” else read digit by digit.
- ❑ 4 digits – If the digits end in zeros (x000), the number is read “x tausend,” else read digit by digit.
- ❑ 5 digits or more - Read digit by digit.

Prosody

Address mode inserts phrase boundaries and accompanying pauses as follows:

- ❑ Between the street address and the post office box, if any.
- ❑ Between the city name and the following federal state, canton or municipality name.
- ❑ Between the city name and any following regional information contained in parentheses.

For example:

Am Reuenberg 4
3462 Weier im Emmental BE

Fichtenweg 6 Postf. 6789
72296 Schopfloch (Kr. Freudenstadt)

Above, the addresses will be read as follows (commas are used to show pauses):

Am Reuenberg vier,
drei vier sechs zwei Weier im Emmental,
Bern

Fichtenweg sechs,
Postfach sechs sieben acht neun,
sieben zwei zwei neun sechs Schopfloch,
Kreis Freudenstadt

Address mode also inserts a sentence boundary at the end of each address when the address is delimited by a double newline. No sentence boundaries are inserted within an address.

Address fragments

Addresses do not need to be complete. The input text can contain address fragments (for example, either the street address part or the city-state part):

```
\!addr1 I. Dorfstr. 14 \!addr0
```

```
\!addr1 44534 Abtsdorf b Lutherstadt (Wittenberg) \!addr0
```



Symbolic Phonetic Representations

The following tables show the inventory of available symbols for use in de-DE Symbolic Phonetic Representations (SPRs). Use this chapter in conjunction with the SPR information found in the *Speechify User's Guide*.

Each sound symbol is accompanied by examples illustrating typical spellings of the sound in actual words, with the letters representing the given sound bolded. Due to dialectal differences, the SPR examples shown may not always agree with your own pronunciations.

Vowels

The following table includes the de-DE symbols for vowels.

Symbol	Example words
i	l ieben, T i tel, t ief
I	b itte, T i sch, L i cht
e	g eben, E hre, S ee
E	t reffen, G e ld, k ämmen
'E:'	K ä se, M ä dchen, w ä gen
A	l assen, m a tt, A pfel
y	B ü cher, T ü r, k ühn
Y	f ünf, f üllen, K ü nstler
'oe'	L ö we, h ören, S ö hne

Symbol	Example words
'OE'	k ö nnen, h ö lzern, ö stlich
u	g u t, U hr, U we
U	H u nd, Fl u ß, M u tter
o	o ber, o hne, B o ot
O	K o pf, St o pp
a	H a ar, h a ben, f a hren
@	bit t e, K a mera, B o den
'aj'	h e im, W a ise, M a i
'oj'	h e ute, Geb ä ude, H ä user
'aw'	H a us, M a ul, F r au
'E~'	T e int
'a~'	Ch a nce
'o~'	Pard o n
'oe~'	Parf u m

Consonants

The following table includes the de-DE symbols for consonants.

Symbol	Example Words
p	P apier, L i ppe, Gr a b
b	B oden, B ett, o ben
t	T ag, bit t e, R a d
d	d unkel, kind i sch, B ü nde, H e lden
k	K atze, E cke, S k ulptur, lag g , qu i tt
g	g e ben, g rau, T a ge

Symbol	Example Words
P	P flanze, Stumpf p fen
T	Z auber, Pol iz ei, Gl an z
C	deu t sch, Ch ile, C ello
J	J ob, D schungel
f	f ast, ho ff en, V ater
v	W agen, v iskös, V olumen, o v al
s	Fu ß , l assen, L ast, Hau s
z	S ee, S atz, le s en
S	s chon, s pielen, S til, wä s cht
Z	J alousie, G enie
X	i ch, C hemie, Kel ch , man ch er
x	Bu ch , Ba ch , Wo ch en
h	h och, H and, A h orn
m	M ann, ko mm en, Ate m
n	N acht, kö nn en, Ki nd
G	F inger, lä ng s, Anfa ng
l	l esen, fa ll en, Pu l t
r	R ad, fö h ren, me hr , Ke r l
R	W ie der, ü ber
j	J unge, J ahr, Minister i um
w	E du ard, aktu ell , Janu ar

Syllable stress

You can mark syllables for stress with a digit. The digit should be placed within the boundaries of the syllable, to the left of the vowel. The following table includes the de-DE symbols for syllable stress.

0	no stress
1	primary stress (most prominent stress in the word)
2	secondary stress

If a word has more than one syllable, you can mark one of these syllables for primary stress, and mark others for secondary stress or no stress.

A syllable that is not marked for stress is assumed to have no stress, unless it is the only syllable of a word, in which case it is assigned a primary stress.

Syllable boundary

The following table includes the de-DE symbol for a syllable boundary.

.	(period) beginning of a syllable
---	----------------------------------

In German SPRs, the period can be used to force a syllable boundary at the specified location. This is useful for generating the correct pronunciation of a morphologically complex word, such as a compound word or a word containing a prefix or suffix. For example:

Input	Pronunciation
\![1ho.fR]	1ho.0fR
\![1hof.2opR]	1hof.2o.0pR

Speechify's default syllabification rules continue to apply where no syllable boundary is specified:

Input	Pronunciation
\![1hofR]	1ho.0fR

The location of syllable boundaries may in turn affect other aspects of the pronunciation:

Input	Pronunciation
\![rA1dar]	0rA.1dar
\![1rad.2An.2tri.0b@]	1rat.2An.2tri.0b@



Phoneme Marks

The phoneme-mark data structure is useful for matching each moment of synthesized speech with the phonemes being spoken. This information is particularly useful when you synchronize facial animation with speech output.

The structure is returned to your application's callback function, which is described under “SWIttsCallback()” in the API reference section of the *Speechify User's Guide*. Each phoneme-mark contains the phoneme name, along with other information about the phoneme. The phoneme-mark symbols for de-DE are documented in the following table.

Note: The phoneme names used in phoneme marks are not necessarily the same as those used for SPR input.

Phone	Example
a	lassen, A pfel
aa	h aben, f ahren
aj	h eim, W aise
an	C hance
ao	K opf, S topp
aw	H aus, M aul
ax	bitte, K amera
axr	Weider, ü ber
b	B oden, o ben
c	i ch, man ch er

Phone	Example
d	d unkel, H el den
dz	J ob, D schungel
e	g e ben, S ee
eh	tr e ffen, G e ld
ehh	K ä se, w ä gen
ehn	T ei nt
el	Nick e l, Vi e rtel
en	Bod e n, lieb e n
f	f ast, h o ffen
g	g eben, T a ge
hh	h och, A h orn
i	lieb e n, t i ef
ih	b i tte, T i sch
j	J unge, Minister i um
k	K atze, l a g
l	l e sen, fall e n
m	M ann, komm e n
n	N acht, Kind
ng	F ing er, Anf ang
o	o ber, B oo t
oe	L ö we, h ö ren
oen	Parf um
oj	h e ute, H ä user
on	Pard on
ooe	k ö nnen, h ö lzern
p	P apier, Grab ba u
pau	[Indicates a pause]

Phone	Example
pf	P flanze, Stumpf en
q	Haus_ <u>a</u> ufgabe, be_ <u>e</u> indrucken [Sound is not written; underscore indicates location]
r	R ad, mehr r
s	lass en , Haus s
sh	sch on, wäs ch t
t	T ag, Rad t
ts	Z auber, Glanz ts
tsh	deuts sch , Cello tsh
u	gut u , Uhr u
uh	H un d, Mut ter
v	W agen, oval v
w	Edu ar d, aktu ell
x	B uch , B ach
y	B ü cher, kü hn
yh	f ün f, K ün stler
z	S ee, les en
zh	G enie, Gar ag e



User Dictionaries

This chapter describes German behaviors for Speechify dictionaries. Use this chapter in conjunction with the dictionary information found in the *Speechify User's Guide*.

The maximum length for German dictionary keys is 128 characters. The maximum translation length is 512 characters.

Main dictionary

The main dictionary is an all-purpose user dictionary for replacing a word in an input text with almost any type of input string. Main dictionary entries are case-sensitive.

Valid main dictionary entries

The following table summarizes the valid main dictionary keys and translations:

Valid key requirement	Valid translation
Latin 1 letters (both upper and lower case), digits. Non-alphanumeric characters, including: @, #, \$, %, &, *, + Apostrophes, quotation marks, parentheses, brackets, etc. Punctuation, except as the final character.	Anything that is valid input to the text- to-speech engine, including white space, punctuation, SPRs, and embedded tags.
Disallowed: white space	Disallowed: SAPI tags, SSML tags, and bookmarks

Main dictionary examples

The following table shows examples of main dictionary entries:

Key	Translation
Kbit/s	Kilobit je Sekunde
GB	Großbritannien und Nordirland
A1	erstklassig
mat@post.de	m a t \[At] Post Punkt d e
UL	Alb-Donau-Kreis

Abbreviation dictionary

The abbreviation dictionary handles word abbreviations that translate to one or more words in ordinary spelling. The entries are case-sensitive.

Valid abbreviation dictionary entries

Valid key requirement	Valid translation
Sequences of one or more letters optionally separated by periods (x.x.x or xx.xx.xx). Sequences of letters, with or without the trailing period that may be considered part of the abbreviation (xxx. or xxx). Internal apostrophes (not the first or last character in the sequence). Uppercase or lowercase letters.	One or more valid words in ordinary spelling, including both upper and lower case letters, separated by white space or hyphen.
Disallowed: digits, non-alphabetic symbols, white space, or punctuation (except periods).	Disallowed: digits, punctuation, SPRs, or embedded tags.

Abbreviation dictionary examples

The following table shows examples of abbreviation dictionary entries:

Key	Translation
Dipl.-Chem.	Diplomchemiker
m.d.R.	mit dem Recht
WDK	Wolga-Don-Kanal
ref.	referiert

Root dictionary

The root dictionary is used for ordinary words, like nouns (including proper names), verbs, or adjectives. Unlike the main and abbreviation dictionaries, it is not case-sensitive.

In German, a root dictionary translation applies when the key occurs as the root of a larger word. For example, if *Toast* is a root dictionary key, the translation value is substituted for *Toast* when it occurs by itself, or as the root of words like *Toaste* and *toasten*. There is no need to enter these words separately in the user root dictionary.

Allowable root dictionary entries

The following table summarizes the format of valid keys and translations in the root dictionary:

Key	Translation
A single word in ordinary spelling, all lowercase letters.	A single word in ordinary spelling. A valid SPR.
Disallowed: digits, punctuation, or other non-letter characters; white space	Disallowed: digits, punctuation, or other non-letter characters, white space, tags.

Root dictionary examples

The following table shows examples of root dictionary entries:

Key	Translation	Would apply to...
zwei	zwo	zwei, zweihundert, zweimal, zweifach, zweiseitig
stil	\![stilc	Stil, Stile, Stils, Stilart, Jugendstil, stilvoll, stillos



W3C SSML

Speechify includes support for input text formatted according to the W3C Speech Synthesis Markup Language (SSML).

In order to invoke the correct processing for German text, the given W3C SSML input must have the `xml:lang` attribute set to “de-DE.” If this attribute is absent, Speechify assumes “en-US” as a default.

In addition to producing German output, the W3C SSML processor for de-DE parses and expands tag content in a manner consistent with that locale. For example, the tag `<say-as type = "currency"> 200 </say-as>` is pronounced “zweihundert Euro.”

For more description of W3C SSML support in Speechify, see the *Speechify User's Guide*.

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